

SELECTION, OPERATION, AND CARE POINTS

NOTES

REFRIGERATION CYCLE:

Heat in refrigerator passes to cooler evaporator and is absorbed by refrigerant as liquid refrigerant changes to gas. Gas compressed by compressor cools in condenser to liquid, giving off heat to outside air. Liquid refrigerant returns to evaporator, vaporizes. Cycle repeats. Thermostatic control is used to start or stop motor operating compressor, holding temp. set.

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FACTORS IN REFRIGERATED FOOD PRESERVATION:

Condition of food	Relative humidity
Storage temperature	Storage time
Air circulation	Storage techniques

ADVANTAGES OF ELECTRIC REFRIGERATION:

1. Retards growth of yeast, mold, bacteria
2. Slows action of enzymes
3. Adds variety, attractiveness, palatability
4. Saves homemaker's time and energy
5. Saves money on: left-overs, spoilage, operating cost, excess produce, special sales, quantity buying & cooking, trips
6. May increase income
7. Improves family health

POSSIBLE REPRODUCTION RATE OF 1 BACTERIUM

No. of Hours	No. of Bacteria
1	4
2	16
3	64
8	65,536
15	1,000,000,000

RETENTION OF VITAMINS:

	In Refrigerator	At Room Temp.
A	Little loss	Gradual loss
B1	Stable	Stable
B2	No loss by light	Loss from light
C	Little loss	Great loss
D	Stable	Stable

REFRIGERATE PRODUCE FOR:

Home usage:

Short period: hours, day, week
Longer time: around 0° F.

Market:

Short period: milk, poultry, veg's.
Longer time: 32-50°- veg's., fruit
Undeveloped freezing possibilities

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TYPES OF REFRIGERATORS:

1. Household refrigerator
 - Combination, two-temperature or two-compartment (small storage-freezer & high-humidity section)
 - Standard or conventional
 - 2- or 4-door commercial- or institutional-type
 2. Home freezer (separate zero box; primarily for storage or with freezing compartment separate)
 - Chest or horizontal type
 - Upright or vertical type
 3. Reach-in farm refrigerator with freezer
 4. Walk-in refrigerator with or without freezer
 5. Milk cooler; specialized cabinets for varied uses
 6. Community chillroom for market or home use
 7. Cold storage locker plant
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ADVANTAGES OF HIGH HUMIDITY:

1. Food can be stored uncovered
2. Vitamin retention is greater
3. Odor transfer is reduced
4. More food can be stored ($1\frac{1}{2}$ -2X)
5. Lower temp. is maintained

Problems

1. Proper control of humidity
 2. Higher initial cost
 3. Higher operation cost
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SELECTION OF HOUSEHOLD REFRIGERATOR:

Type: Combination or standard; home size or institutional

Size: 6 cu. ft. for two & 1 cu. ft. for each extra two

7 cu. ft. for two & 1 cu. ft. for each extra one
allows fuller use, more saver of time, energy

Storage: Space for frozen foods, meats, cream or milk, veg's., fruits, eggs, advance food preparation

Adjustable features - convenience vs. cost

Feature and cost comparison: economy, standard, deluxe

Door opening properly for location

6 CU. FT. REFRIGERATOR REQUIRES FOR

MONTHLY OPERATION APPROXIMATELY:

Ice	700* lbs.
Electricity	30 kwh.
Kerosene	15 gal.
Natural gas	1,000 cu. ft.
Mfg. gas	1,800 cu. ft.

CABINET:

Dimensions--wide, shallow

Steel--electrically welded, bonderized

Exterior--baked-on synthetic enamel
porcelain enamel

Interior--acid-resisting procelain enamel at least
in bottom; seamless, rounded corners, light

Door--tight-fitting, soft gasket, breaker strips

Hardware--rust-resistant, convenient, sturdy

* Recent Iowa State College study shows 480 lbs.

SHELVES:

Rust-resistant:

Glass; aluminum Stainless steel
Chromium-plated Tin-dipped steel
Sturdily constructed
Closely spaced bars or diamond mesh
Conveniently spaced in box
Easily removed and replaced
Adjustable height--removable sections
Safety bars & locks if sliding

INSULATION--CONSIDER:

Thickness--minimum, 2"; 3" or 4" best
Conductivity--low
Moisture resistant--proofed or encased
Vibration stability
Freedom from odor
Resistant to mold and vermin

MECHANISM--REFRIGERANT:

Refrigerant: Low and high pressure
Evaporator: Flooded or dry
Motor: Sealed or open
Compressor: Rotary or reciprocating
Condenser: Radiator or plate
Temp. control: Thermostat or pressure

LOCATION OF REFRIGERATOR:

In preparation center - counter nearby

In cool place

Not below 60°-65°F.

Not too near stove

Not in sunshine

Away from heating units

In dry place

Air circulation good: 2½" at back
8-12" above

Level - door should stay open anywhere

OPERATION OF REFRIGERATOR:

1. Maintain cabinet temperature about 40°F.*
2. Use thin containers; cover**
3. Use clean containers; wipe cans, bottles
4. Wash and drain veg's., fruits; don't soak
5. Cool hot foods before storing usually
6. Assemble things to be put in refrigerator
7. Place most-used foods near front
8. Allow space for air circulation **
9. Wet bottom of tray for fast freezing
10. Fill trays to ¼" of top
11. Reset after freezing and defrosting
12. Take several foods out at once

* Check with thermometer in morning (or with door closed at least 1 hour before reading); nowhere should temperature be over 50°.

** Not so necessary in high-humidity section of combination household refrigerator.

SAVING TIME WITH THE REFRIGERATOR:

Biscuit mixture	Sandwich spreads
Pastry mixture	Sandwiches, lunches
Ref. roll dough	White
Ref. cookie dough	Sauces: Cheese
Cake & other batters	Tomato
Meat loaves, croq.	Dessert
Salads, garnishes	
Advance veg. prep.	Beverage syrups
Grated cheese, rind	Ice cream base
Salad dressings	Quantity cooking:
Potatoes, eggs	Dried fruit Soup
Casserole dishes	Cereals Stew

REFRIGERATION OF FOODS:

<u>Must be</u>	<u>Can be</u>
Dairy products	Cabbage, cucumbers
Fresh meat	Fresh citrus fruit
Frozen foods	Peaches, pineapple
Left-overs, ckd.	Pears, cantaloupe
Open canned goods	Watermelon
" bottled gds.	Bread, cake, pie
Fresh veg's.	Coffee, chocolate
Fresh fruits	Carbonated bev's
	Peanut butter
<u>Must not be</u>	Salad dressing
Bananas	Pickles, olives

FOODS TO BE STORED -	TEMPERATURE	HUMIDITY
Frozen foods	0-15°	0
Meats, fish, fowl	34-37°	80-90%
Milk, beverages	38-40°	
Butter, staples	40-43°	Moderate
Left-overs, puddings	40-43°	Moderate
Veg's., fruits, eggs	40-45°	85-95%

FOOD STORAGE IN CONVENTIONAL REFRIGERATOR:

1. Frozen food: In frozen-food container
2. Meat: Unwrap, cover loosely
3. Milk: In clean, covered container
4. Butter: In butter dish or freezer paper
5. Left-overs: Cover
6. Batters: Cover
7. Eggs: Cover unless used soon
8. Fruits: Berries - unhulled, unwashed, in shallow pan; cover loosely.
All others washed & covered except short-time storage of plums, pears, citrus fruits.
9. Vegetables: Cover. Leave corn in inner husks; peas, lima beans in pods or shell late as possible & hold in covered jar. Cabbage, cucumber might be left briefly uncovered.

Avoid cutting fruits, veg's., meats in advance

HOW TO KEEP MEAT:

Not to be frozen:

Unwrap; wipe with damp cloth; dry
Place in container
Cover loosely with waxed paper;
Or place in meat keeper
Use fish, ground & variety meats in 24 hours

To be frozen:

Wrap in waxed paper; separate portions
Place in tray on bottom shelf of freezer
Set control at coldest position
Reset to colder than normal later

Poultry: clean, wash, leave whole

FOR GOOD FROZEN DESSERT:

1. Follow good recipe--use cold ingredients
2. Whip thin cream lightly
3. Beat egg whites medium-stiff
4. Freeze rapidly--wet trays on bottom
5. Crush and drain fruits used
6. Chill bowl, beater; beat well
7. Raise temperature after frozen
8. Cover with waxed paper for storage

Ice cream: Stir once during freezing

Ices: Stir twice during freezing

Sherberts: Stir twice during freezing

Mousses: No stirring during freezing

Parfaits: No stirring during freezing

FOR SMOOTH DESSERTS:

Increase air content:

Whipped cream or evaporated milk

Beaten egg whites, gelatin

Increase viscosity:

Cornstarch Gelatin Cookie crumbs

Corn syrup Egg yolks Flour

Increase sugar

$\frac{1}{4}$ c. sugar to 1 c. liquid is enough

Decrease water (milk and fruit juice)

$\frac{3}{4}$ c. custard to 1 c. cream

VARY ICE CREAM BY USING:

Cooked dried fruits	Coffee
Cooked-juice syrup	Chocolate syrup
Fruit sauces, butters	Caramel, butterscotch
Preserves	Toffee candy - rolled
Mashed fresh fruits	Peppermint - rolled
Fresh juice, rind	Peanut brittle - rolled
Brown sugar	Nuts
Maple sugar	Crackers, cookies
Honey, molasses	Coconut

CARE OF REFRIGERATOR:

1. Open and close door by handle
2. Store only clean things in refrigerator
3. Wipe up spillage immediately
4. Avoid acid fruits touching enamel
5. Don't use sharp instruments on freezer
6. Defrost when $\frac{1}{4}$ " thick: clean & dry;
empty drip page; refill trays; re-set
7. Avoid using harsh abrasives
8. Check gasket, hinges for tightness
9. Touch up scratches (see dealer)
10. Check up regularly & if motors runs a lot
11. Empty, clean, open door for storage
Open unit - call serviceman in
Sealed unit - no attention, no oiling
12. Oil open unit according to instructions

CARE OF REFRIGERATOR -- CLEANING

Interior: 1 T soda to 1 qt. warm water
Remove food, equip. Wash; dry
Use soapy water on shelves, containers
Avoid hot water on trays, glass

Gasket: Use warm water, mild soap, clean cloth
Rinse carefully. Wipe very dry

Exterior: Use warm soapy water; rinse, dry
Wax 2 or 3 times per year; polish

Condenser: Disconnect refrigerator. Clean
with whisk broom or vacuum cleaner

COST OF OPERATION DEPENDS ON:

Insulation	Food stored
Location	Quantity
Ventilation	Temperature
Temperature	Wrong containers
Inside	Crowded shelves
In room	Covering food
Ice on unit	No. of ice cubes
Dirty condenser	Desserts frozen
Gasket condition	Unnecessary refrigeration
Size	Opening door

COOLING LOAD:

Opening and closing doors	5%
Cooling foods and liquids	18%
Leakage (insulation joints)	77%

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